ATTACHMENT 1

Statement of Public Need

The proposed Facility will provide reliable wireless communications services in northern portions of the Town of Monroe along segments of Fan Hill Road, Hammertown Road, Wheeler Road and local roads and to homes in the surrounding area. The Facility is needed by AT&T in conjunction with other existing facilities in Monroe and Newtown to provide service to the public in this part of the State. The proposed Facility will also improve service at the Chalk Hill School complex, where wireless service is currently provided by a temporary AT&T facility, which will be removed upon completion of the installation of AT&T's proposed Facility. Attached is a Radio Frequency (RF) Engineering Report with coverage plots depicting the "Current Coverage" provided by AT&T's existing facilities in this area of the State and "Proposed (Composite) Coverage" as predicted from the proposed Facility together with existing coverage from adjacent sites. Additional statistics regarding the overall area, population and roadway miles that will be served by the proposed Facility are also included.

Radio Frequency Analysis Report

S1200H
30 Cobblers Hill Ct, Monroe, CT

April 29, 2014

C Squared Systems, LLC
65 Dartmouth Drive, A3
Auburn, NH 03032

Phone: (603) 644-2800
Fax: (603) 644-2801
Support@csquaredsystems.com

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1. Overview

C Squared Systems was retained by New Cingular Wireless PCS, LLC ("AT&T") to investigate the extent of coverage that could be potentially obtained by constructing the proposed wireless communications facility at 30 Cobblers Hill Ct, Monroe, CT at 151 feet AGL.

AT&T is licensed by the FCC to provide wireless communications services throughout the State of Connecticut including the Town of Monroe where the proposed facility would be located.

This report addresses AT&T's need for the proposed wireless facility and confirms that there are no other suitable existing structures that could address the coverage gaps in their wireless communications network. The coverage analysis completed by C Squared Systems confirms: AT&T has a gap in reliable service in Monroe, and that the Proposed Facility provides AT&T with coverage in that service gap. Included as attachments in this report are coverage maps detailing the existing network and expected coverage from the proposed facility, pertinent site information, and terrain and network layout maps.

2. Technology Advances & Design Evolution

AT&T provides digital voice and data services using 3rd Generation (3G) UMTS technology in the 800 MHz and 1900 MHz frequency band, and is in the midst of deploying advanced 4th Generation (4G) services over LTE technology in the 700 MHz and 1900 MHz frequency bands as allocated by the FCC. As part of their network expansion and ongoing technology advancements in Connecticut and elsewhere in the Country, the 4G LTE network rollout will build on the existing 3G data services that utilize UMTS technology. These data networks are used by mobile devices for fast web browsing, media streaming, and other applications that require broadband connections. The mobile devices that benefit from these advanced data networks are not limited to basic handheld phones, but also include devices such as smartphones, PDA's, tablets, and laptop air-cards. With the evolving rollout of 4G LTE services and devices, AT&T customers will have even faster connections to people, information, and entertainment.

It is important to note that with AT&T's migration from 3G to 4G services come changes in the base station infrastructure and resultant changes in the operating thresholds required by the LTE network. In the past, AT&T has presented receive signal thresholds of -74 dBm for their in-building coverage threshold and -82 dBm for their in-vehicle coverage threshold. Those thresholds were based on network requirements to support 2G/3G data speeds and past usage demand. Today, customers expect low latency and faster data speeds as evidenced by increasing data usage trends and customer demand.

AT&T's 4G LTE technology is designed to thresholds of -83 dBm and -93 dBm for their 700 MHz LTE and -86 dBm and -96 dBm for their 1900 MHz LTE.[1] The stronger thresholds (-83 dBm and -86 dBm) yield greater throughputs and improved customer experience. The -93 dBm and -96 dBm thresholds are the minimum acceptable levels required to meet customer expectations for 4G service.

[1] The threshold range differences between the 700 MHz and 1900 MHz frequency bands directly correlates to the type branch diversity receivers deployed in AT&T's receiver design.

3. Coverage Objective

There is a significant coverage deficiency in the existing AT&T wireless communications network along Pinto Ln, Mustang Ln, Wild Horse Ct, Turkey Roost Rd, Wheeler Rd, and the neighboring residential areas in Monroe, referred to herein as the "targeted area". A deficiency in coverage is evidenced by the inability to adequately and reliably transmit/receive quality calls and/or utilize data services offered by the network. Seamless reliable coverage provides users with the ability to successfully originate, receive, and maintain quality calls and data applications throughout a service area. Appropriate overlapping coverage is required for users to be able to move throughout the service area and reliably "hand-off" between cells to maintain uninterrupted connections.

Due to terrain characteristics and the distance between the targeted coverage area and the existing sites, AT&T's options to provide services in this area are quite limited (maps of the terrain in this area and the distance to neighboring AT&T sites from the proposed site are included as Attachments 1 & 2, respectively.). AT&T's network requires deployment of antennas throughout the area to be covered. These antennas are connected to receivers and transmitters that operate in a limited geographic area known as a "cell." AT&T's wireless network, including their wireless handsets and devices, operate by transmitting and receiving low power radio frequency signals to and from these cell sites. The signals are transferred to and from the landline telephone network and routed to their destinations by sophisticated electronic equipment. The size of the area served by each cell site is dependent on several factors, including the number of antennas used, the height at which the antennas are deployed, the topography of the land, vegetative cover and natural or man-made obstructions in the area. As customers move throughout the service area, the transmission from the portable devices is automatically transferred to the AT&T facility with the best connection to the device, without interruption in service provided that there is overlapping coverage from the cells.

In order to define the extent of the coverage gap to be filled, both propagation modeling and real-world drive testing has been conducted in the area of Monroe. Propagation modeling uses PC software to determine the network coverage based on the specific technical parameters of each site including, but not limited to, location, ground elevation, antenna models, antenna heights, and also databases of terrain and ground cover in the area. Drive testing consists of traveling along area roadways in a vehicle equipped with a sophisticated setup of test devices and receivers that collect a variety of network performance metrics. The data are then processed and mapped in conjunction with the propagation modeling to determine the coverage gaps.

Analysis of the propagation modeling and drive testing in Monroe reveal that AT&T's network is unreliable throughout much of the area due to gaps in coverage, and that there is a service deficiency as a result. In order to fill in these coverage gaps and improve the network reliability to Monroe, a new facility is needed in the area.

Table 1 below approximates the current coverage gap of AT&T's 700 MHz and 1900 MHz (PCS) LTE technology in the vicinity of the proposed site.

	Existing 700 MHz LTE Coverage Gap		**Existing 1900 MHz LTE Coverage Gap**	
Population:[2]	(≥ -83 dBm)	9,598	(≥ -86 dBm)	9,831
	(≥ -93 dBm)	6,915	(≥ -96 dBm)	8,504
Area (mi²):	(≥ -83 dBm)	14.13	(≥ -86 dBm)	14.48
	(≥ -93 dBm)	9.65	(≥ -96 dBm)	12.28
Roadway (mi):	Main:	2.11	Main:	3.23
	Secondary:	54.82	Secondary:	65.51
	Total:	56.93	**Total:**	68.74

Table 1: Estimated Existing Coverage Gap Statistics

[2] Population figures are based upon 2010 US Census Block Data

Included with this report are Attachments 1-8, which are explained below to help describe AT&T's network in and around Monroe, and the need for the proposed facility.

- Attachment 1: *3D Terrain Map* details the terrain features around the area of deficient service being targeted by the proposed site in Monroe. These terrain features play a key role in determining site designs and dictating the unique coverage achieved from a given location. This map is included to provide a visual representation of the ridges and valleys that must be considered when siting a wireless facility. The green and blue shades correspond to lower elevations, whereas the yellow and red shades indicate higher elevations.

- Attachment 2: *Map of Distance to Neighbor Sites – Monroe* provides an overview of AT&T's network of sites in the area, with distances shown from the proposed Monroe site to the existing and proposed sites in the surrounding area.

- Attachment 3: *Neighbor Site Data and Distance to Proposed Site* provides site specific information of existing neighboring sites used to perform the coverage analysis provided in Attachments 4 through 7.

- Attachment 4: *"Existing 700 MHz LTE Coverage" for the Current AT&T Network* depicts 700 MHz LTE coverage from existing sites and demonstrates that there are currently gaps in 700 MHz LTE coverage effecting service within the targeted area. The coverage shown is where the signal strengths are: > -83 dBm (minimum level required reliable, high quality service and performance at 700 MHz) and, > -93 dBm (minimum required for adequate level of service at 700 MHz). In an effort to provide the required levels of coverage to these areas, AT&T is proposing to install a wireless facility at the Rose Hill Road location.

- Attachment 5: *"Existing & Proposed 700 MHz LTE Coverage" with Monroe Site for the AT&T Network* shows how this proposed site would fill in the existing coverage gaps and improve AT&T's 700 MHz LTE network within the targeted area, as detailed in Table 2.

- Attachment 6: *"Existing 1900 MHz LTE Coverage" for the Current AT&T Network* depicts 1900 MHz LTE coverage from existing sites and demonstrates that there are currently gaps in the 1900 MHz LTE coverage effecting service within the targeted area. The coverage shown is where the signal strengths are > -86 dBm (minimum level required for reliable high quality service and performance at 1900 MHz) and > -96 dBm (the minimum required for adequate level of service at 1900 MHz).

- Attachment 7: *"Existing & Proposed 1900 MHz LTE Coverage" with Monroe Site for the AT&T Network* shows how this proposed site would fill in the existing coverage gaps and improve AT&T's 1900 MHz LTE network within the targeted area, as detailed in Table 2.

- Attachment 8: *Connecticut DOT Average Annual Daily Traffic Data – Monroe* shows the available vehicular traffic volume data for the subject area from the Connecticut Department of Transportation. This data shows as many as 5,000 vehicles per day passing through the subject area on Fan Hill Rd at Jockey Hollow Rd. This location is south of the proposed site.

Table 2 below lists the coverage statistics that were compiled for each frequency band of the proposed site:

	Incremental Coverage from Proposed Site (700 MHz)		Incremental Coverage from Proposed Site (1900 MHz)	
Population Coverage:[3]	(≥ -83 dBm)	834	(≥ -86 dBm)	465
	(≥ -93 dBm)	2,548	(≥ -96 dBm)	1,606
Area Covered (mi²):	(≥ -83 dBm)	1.11	(≥ -86 dBm)	0.59
	(≥ -93 dBm)	3.22	(≥ -96 dBm)	2.07
Roadway Coverage (mi):	Main:	0.41	Main:	0.21
	Secondary:	19.5	Secondary:	11.96
	Total:	19.91	**Total:**	12.17

Table 2: Coverage Statistics

[3] Population figures are based upon 2010 US Census Block Data

4. Conclusion

AT&T has identified an area of deficient coverage affecting the central portion of Monroe, including key traffic corridors through the residential areas of Town. The proposed Monroe facility will bring the needed fill-in coverage to significant portions of Pinto Ln, Mustang Ln, Wild Horse Ct, Turkey Roost Rd, Wheeler Rd, and the residential neighborhoods in the vicinity of these roads, all of which are currently within this coverage gap of AT&T's network.

No existing structures were identified and available that would be able to satisfy the coverage requirements needed for this area. The location and the minimum height selected were chosen to achieve an optimal balance between meeting coverage objectives, overcoming the tree line for signal propagation, minimizing the aesthetic impact to the community, and future collocation.

As discussed in this report and depicted in the attached plots, the proposed AT&T site will provide the public need for service in this area, by providing an appropriate coverage footprint for the Monroe community along with effective connectivity to the rest of AT&T existing network.

Without a site in this area, at the height requested, significant gaps in service will exist within the Town of Monroe, and the identified public need for reliable wireless services in this area will not be met.

5. Statement of Certification

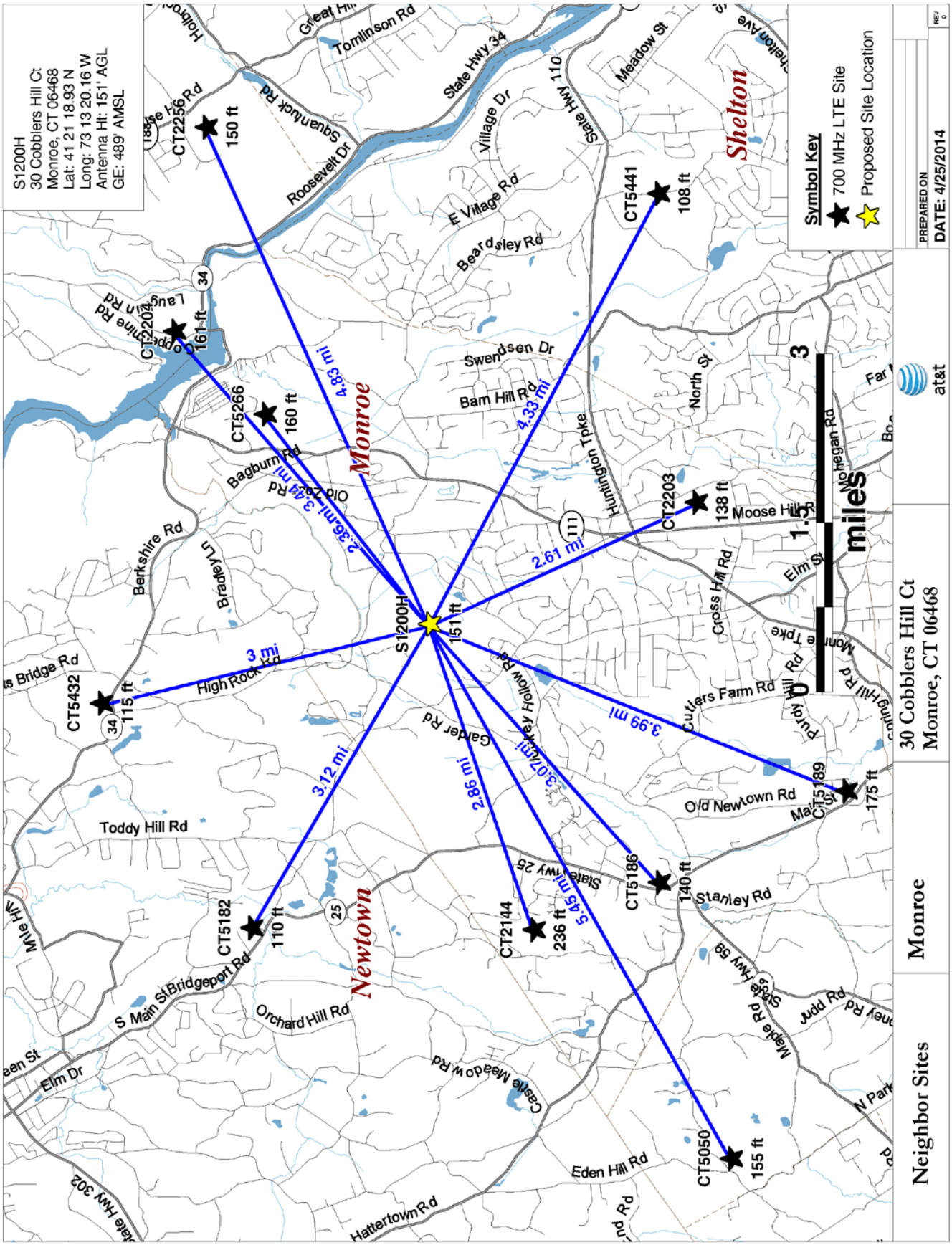
I certify to the best of my knowledge that the statements in this report are true and accurate.

_____ April 29, 2014

Anthony Wells Date
C Squared Systems, LLC

6. Attachments

Attachment 1: 3D Terrain Map

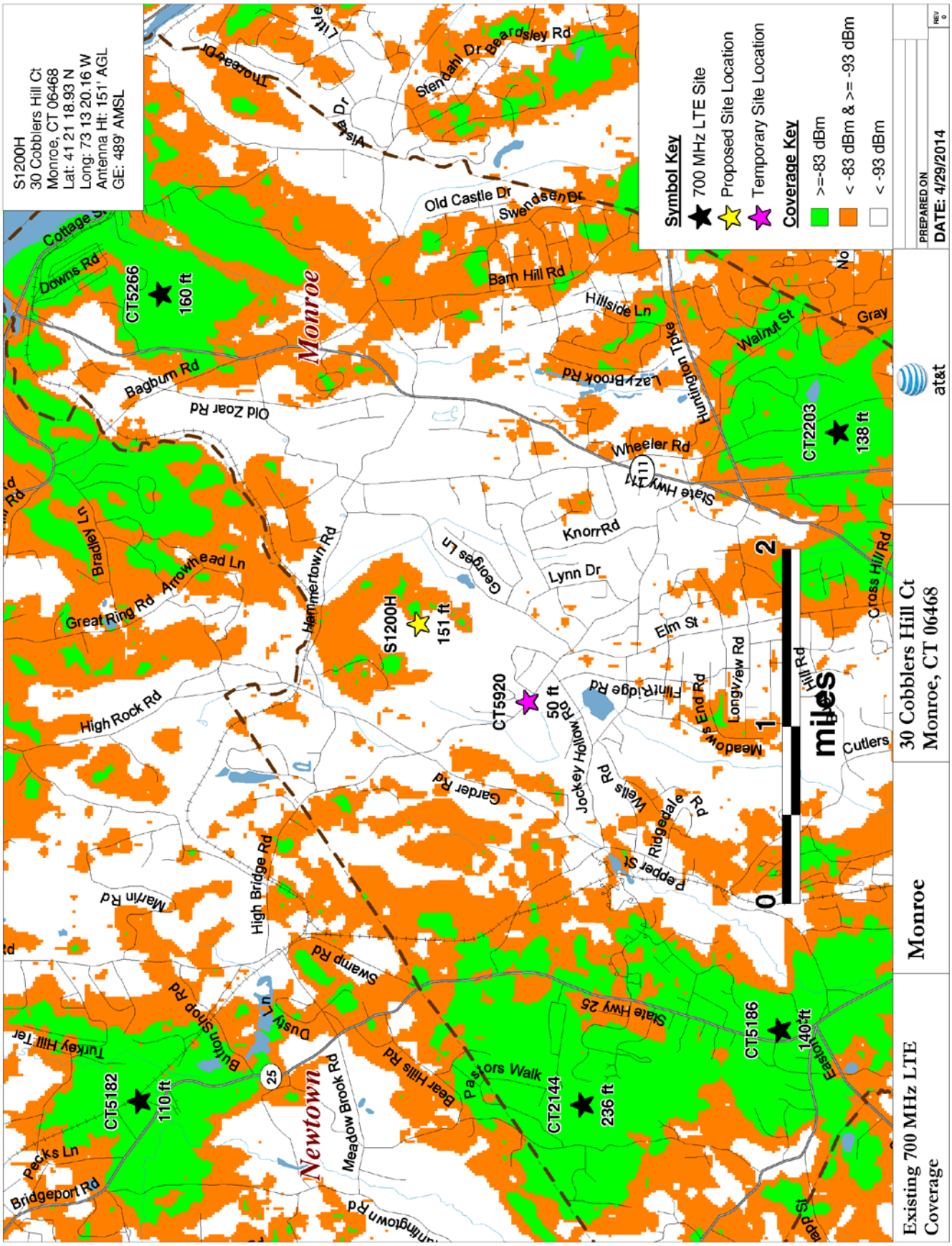


Attachment 2: Map of Distance to Neighbor Sites – Monroe

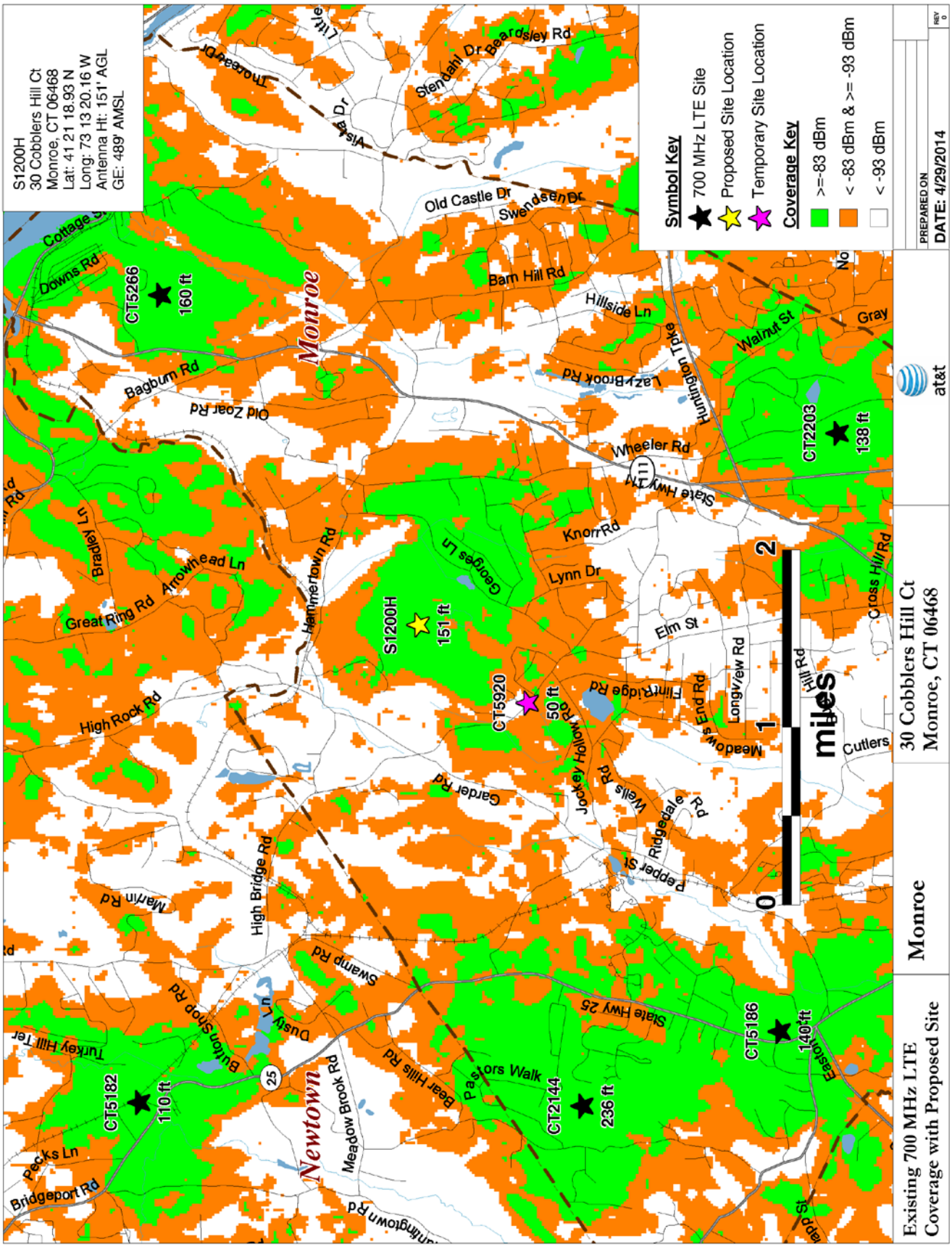
Site Name	Address	Town	Latitude	Longitude	Antenna Centerline (feet)	Distance to Proposed Site (miles)	Structure Type	Ground Elevation (feet)
CT2127	Route 34	Newtown	41.41258	-73.2701	177	4.67	Monopole	353
CT2144	230 Guinea Rd	Monroe	41.34185	-73.2745	236	2.86	Lattice	585
CT2203	500 Moose Hill Rd	Monroe	41.32096	-73.2014	138	2.61	Monopole	619
CT2204	133 Coppermine Rd	Oxford	41.38806	-73.1722	161	3.44	Monopole	184
CT2256	85 Quaker Farms Rd	Oxford	41.38398	-73.1374	150	4.83	Monopole	629
CT2313	3 Edmond Rd	Newtown	41.42081	-73.2985	120	6.01	Monopole	340
CT5050	275 North St	Easton	41.31639	-73.3136	155	5.45	Monopole	551
CT5182	201 South Main St	Newtown	41.37813	-73.2742	110	3.12	Monopole	378
CT5186	474 Main St	Monroe	41.32569	-73.2664	140	3.07	Monopole	450
CT5189	88 Main St	Monroe	41.30165	-73.2508	175	3.99	Monopole	317
CT5266	1428 Monroe Turnpike	Monroe	41.37639	-73.1864	160	2.36	Monopole	590
CT5432	151 Berkshire Rd	Sandy Hook	41.39749	-73.2358	115	3.00	Monopole	597
CT5441	165 Birdseye Rd	Shelton	41.3258	-73.1487	108	4.33	Monopole	614
CT5446	206 Everett Rd	Easton	41.29038	-73.2827	118	5.47	Monopole	444
CT5511	8 Ferris Rd	Newtown	41.38975	-73.3382	88	6.47	Monopole	790
CT5920[4]	375 Fan Hill Rd	Monroe	41.34634	-73.23074	50	0.75	Temporary	405

Attachment 3: Neighbor Site Data and Distance to Proposed Site

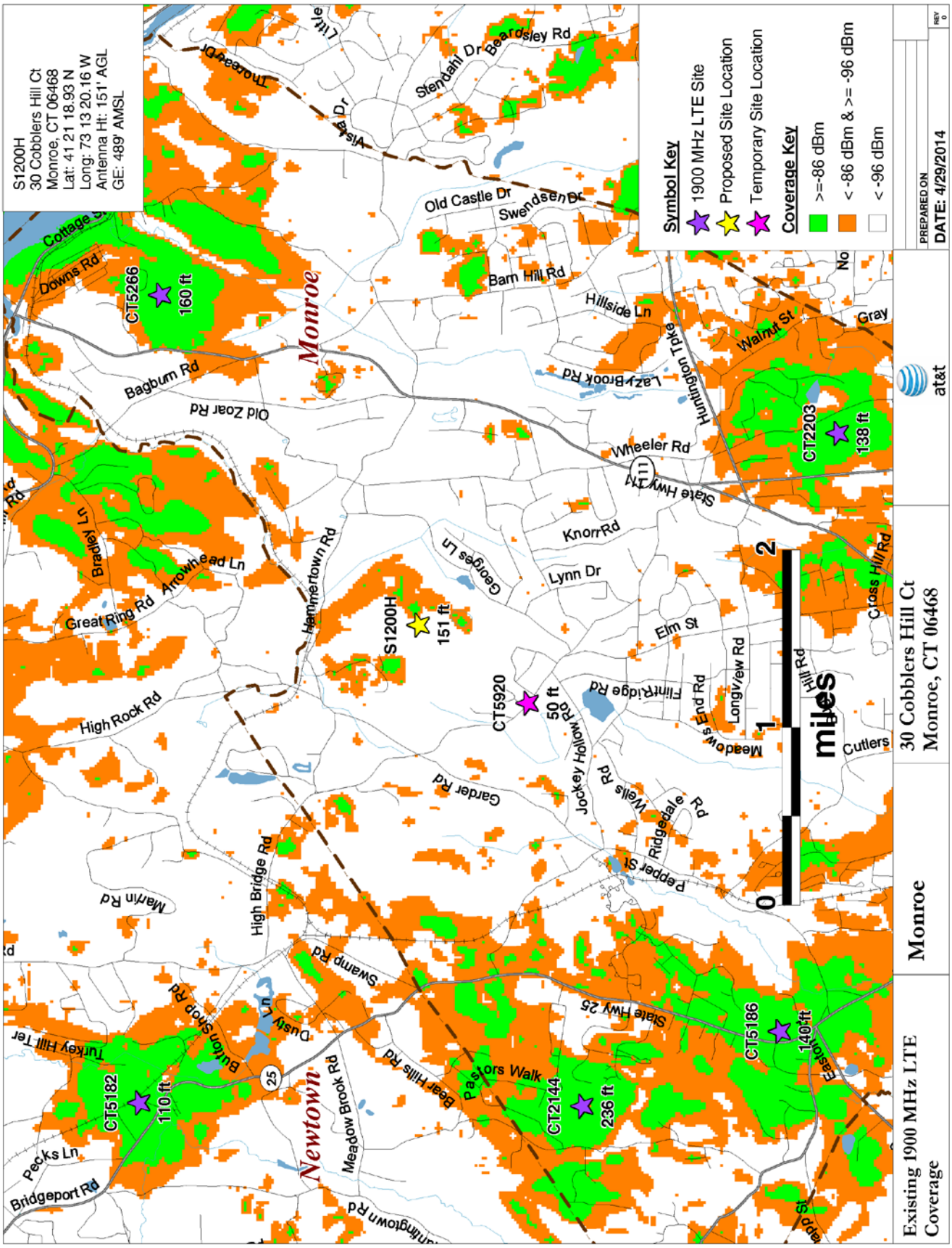
[4]CT5920 is a temporary site deployed during the relocation of the Newtown School.



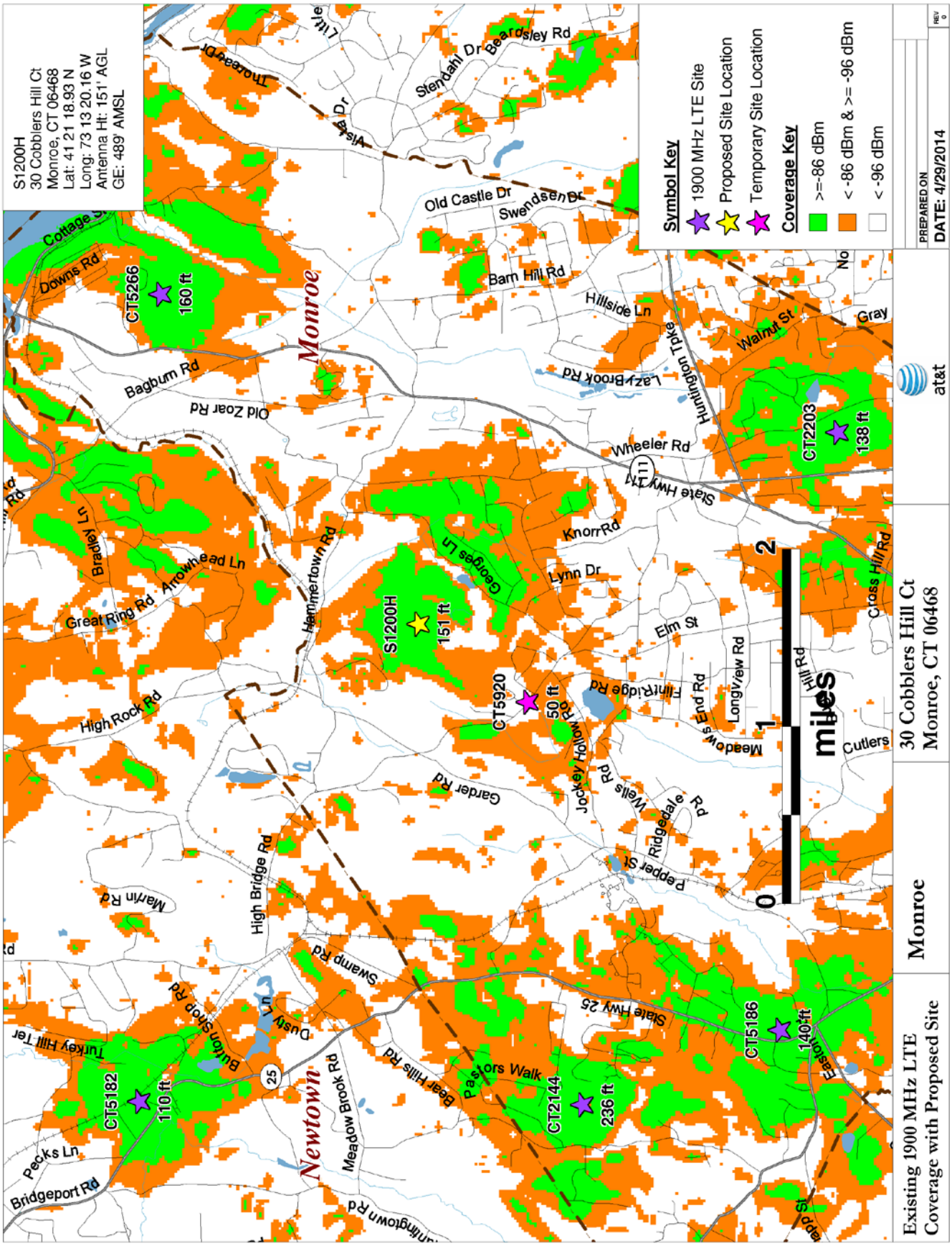
Attachment 4: "Existing 700 MHz LTE Coverage" for the Current AT&T Network



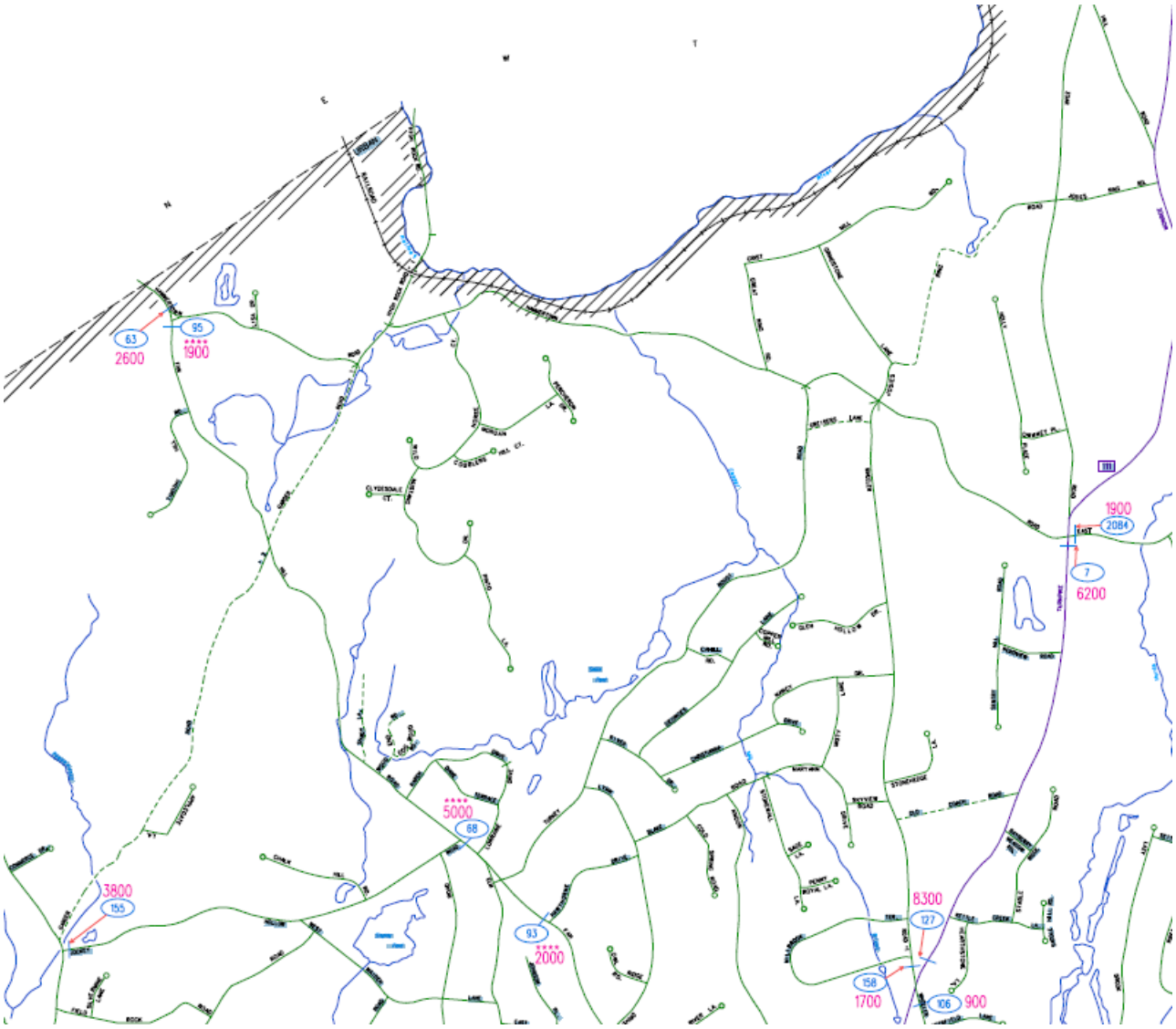
Attachment 5: "Existing & Proposed 700 MHz LTE Coverage" with Monroe Site for the AT&T Network



Attachment 6: "Existing 1900 MHz LTE Coverage" for the Current AT&T Network



Attachment 7: "Existing & Proposed 1900 MHz LTE Coverage" with Monroe Site for the AT&T Network



Attachment 8: Connecticut DOT Average Annual Daily Traffic Data – Monroe